

WHAT IS CLAIMED IS:

1. Apparatus for guiding an elongate member onto a substrate as the substrate is moved relative to the apparatus in a flow direction of the substrate, said apparatus comprising:

5 a guide assembly having a positioning arm adapted for pivoting movement relative to the flow direction of the substrate about a rotation axis of the positioning arm, and a guide adapted for receiving and guiding the elongate member onto the substrate, the guide being supported by the positioning arm in radially spaced relation with the rotation axis of the positioning arm such that pivoting movement of the positioning arm laterally positions the guide relative to the flow direction of the substrate, said guide having an angular orientation relative to the flow direction of the substrate, said apparatus being adapted to move the guide relative to the positioning arm such that the angular orientation of the guide relative to the flow direction of the substrate remains substantially constant as the guide is positioned laterally relative to the flow direction of the substrate.

10 2. Apparatus as set forth in claim 1 wherein the guide assembly is movable generally laterally relative to the flow direction of the substrate for laterally positioning the rotation axis of the positioning arm relative to the flow direction of the substrate.

15 3. Apparatus as set forth in claim 2 further comprising a base, the guide assembly being connected to the base and adapted for movement relative to the base and generally laterally relative to the flow direction of the substrate.

5 4. Apparatus as set forth in claim 3 wherein the guide assembly is connected to the base by a pair of linkage bars extending therebetween in

parallel, spaced relation with other, said base and said guide assembly each being pivotally connected to the linkage bars.

5 5. Apparatus as set forth in claim 4 further comprising a first pulley rotatably mounted on the base, a second pulley rotatably mounted on the guide assembly in coaxial relationship with the rotation axis of the positioning arm, the positioning arm being in engagement with the second pulley for conjoint rotation therewith about the rotation axis of said arm, and a continuous belt supported in tension by said first and second pulleys such that rotation of said first pulley relative to said base causes rotation of said second pulley about the rotation axis of the positioning arm to pivot said positioning arm.

5.1 6. Apparatus as set forth in claim 3 further comprising a first pulley mounted on the positioning arm in coaxial relationship with the rotation axis of the positioning arm, a second pulley mounted on the positioning arm in spaced relationship with the first pulley and being rotatable about a rotation axis of said second pulley spaced radially from the rotation axis of the positioning arm, and a continuous belt supported in tension by the first and second pulleys whereby rotation of the positioning arm about its rotation axis causes rotation of the second pulley about the rotation axis of said second pulley, the guide being mounted on said second pulley in radially spaced relation with the rotation axis of said second pulley for orbital movement of the guide about the rotation axis of said second pulley.

10 7. Apparatus as set forth in claim 1 wherein the guide is a first guide for receiving and guiding a first elongate member onto the substrate and the positioning arm is a first positioning arm, the guide assembly having a second positioning arm adapted for pivoting movement relative to the flow direction of the substrate about a rotation axis of the second positioning arm, and a

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second guide adapted for receiving and guiding a second elongate member onto the substrate, the second guide being supported by the second positioning arm in radially spaced relation with the rotation axis of the second positioning arm such that pivoting movement of the second positioning arm laterally positions the second guide relative to the flow direction of the substrate, said second guide having an angular orientation relative to the flow direction of the substrate, said apparatus being adapted to move the second guide relative to the second positioning arm such that the angular orientation of the second guide relative to the flow direction of the substrate remains substantially constant as the second guide is positioned laterally relative to the flow path of the substrate

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8. Apparatus as set forth in claim 7 wherein the first and second positioning arms are adapted for rotation about their respective rotation axes in directions counter to each other to vary the lateral spacing between the first and second guides to thereby vary the lateral spacing between said first and second elongate members as said elastic members are directed by the guides onto the substrate.

9. Apparatus as set forth in claim 1 further comprising a drive assembly operatively connected to the positioning arm for pivoting the positioning arm about its rotation axis.

10. Apparatus for guiding a pair of elongate members onto a substrate as the substrate is moved relative to said apparatus in a flow direction of said substrate, said apparatus comprising:

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a guide assembly having a pair of guides, each guide being adapted for guiding a respective one of said elongate members onto the substrate, the guide assembly being movable generally laterally relative to the flow direction of said substrate for guiding the elongate members onto the substrate along a

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securement path, at least a portion of which extends oblique to the flow direction of said substrate, said apparatus being adapted to move the guides relative to the guide assembly for further guiding the elongate members onto said substrate in variable spaced relationship with each other generally within said securement path.

11. Apparatus as set forth in claim 10 wherein the apparatus is adapted to move the guides relative to the guide assembly for further guiding the elongate members onto the substrate so that the elongate members cross each other at least once along said securement path.

12. Apparatus as set forth in claim 10 wherein the apparatus is adapted to move the guide relative to the guide assembly for further guiding at least one of the elongate members onto the substrate in a generally periodic wave pattern within the securement path whereby at least one period of said periodic wave pattern is defined within said securement path.

13. Apparatus as set forth in claim 12 wherein the apparatus is adapted to move the guides relative to the guide assembly for further guiding each of the elongate members onto the substrate in a generally periodic wave pattern within the securement path whereby at least one period of each periodic wave pattern is defined within said securement path, one elongate member having a different periodic wave pattern than the other elongate member such that the spacing between the elongate members varies along said securement path.

14. Apparatus as set forth in claim 13 wherein the apparatus is adapted to move the guides relative to the guide assembly for further guiding the elongate members onto the substrate so that the periodic wave pattern of

said one elongate member is the negative of the periodic wave pattern of said other elongate member.

15. Apparatus as set forth in claim 14 wherein the guides define a first guide and a second guide, said guide assembly further comprising a first positioning arm adapted for pivoting movement about a rotation axis thereof relative to the flow direction of the substrate, the first guide being supported by the first positioning arm in radially spaced relation with the rotation axis of the first positioning arm such that pivoting movement of the first positioning arm laterally positions the first guide relative to the flow direction of the substrate, and a second positioning arm adapted for pivoting movement about a rotation axis thereof relative to the flow direction of the substrate, the second guide being supported by the second positioning arm in radially spaced relation with the rotation axis of the second positioning arm such that pivoting movement of the second positioning arm laterally positions the second guide relative to the flow direction of the substrate.

16. Apparatus for guiding an elongate member onto a substrate as the substrate is moved relative to the apparatus in a flow direction of the substrate, said apparatus comprising:

5 a base secured against lateral movement relative to the flow direction of said substrate,

10 a guide assembly having a guide supported thereon for receiving and guiding the elongate member onto the substrate, said guide assembly being pivotally connected to the base in spaced relationship therewith for movement of the guide assembly relative to the base to laterally position the guide assembly relative to the flow direction of the substrate, at least a portion of the guide assembly having an angular orientation relative to the flow direction of the substrate, said apparatus being adapted to maintain the angular orientation of said portion of the guide assembly generally constant relative to

15 the flow direction of the substrate upon lateral movement of the guide assembly relative to the flow direction of the substrate.

10 5 17. Apparatus as set forth in claim 16 further comprising linkage pivotally connected at one end to the base for pivoting movement relative to the base, said portion of the guide assembly being pivotally connected to an opposite end of said linkage for lateral movement of the guide assembly relative the flow direction of the substrate upon pivoting movement of the linkage relative to the base and for pivoting movement of said portion of the guide assembly relative to the linkage such that the angular orientation of said portion of the guide assembly relative to the flow direction of the substrate remains generally constant upon lateral movement of the guide assembly relative to the flow direction of the substrate.

5 18. Apparatus as set forth in claim 17 wherein the linkage comprises a pair of linkage bars pivotally connected at one end to the base in parallel, spaced relationship with each other for pivoting movement relative to the base to move an opposite end of the linkage bars laterally relative to the flow direction of the substrate, said portion of the guide assembly being pivotally connected to said opposite end of the linkage bars.

5 19. Apparatus as set forth in claim 18 wherein the guide assembly further comprises a guide plate defining said portion of the guide assembly pivotally connected to the opposite end of the linkage bars to permit generally lateral movement of the guide plate relative to the base and the flow direction of the substrate, the guide being supported by the plate for lateral movement therewith relative to the flow direction of the substrate while the angular orientation of the guide plate relative to the flow direction of the substrate remains generally constant.

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20. Apparatus as set forth in claim 19 wherein the guide assembly further comprises a positioning arm pivotally mounted on the guide plate for rotation about a rotation axis of the positioning arm, the guide being supported by the positioning arm in radially spaced relation with the rotation axis thereof for orbital movement of the guide about the rotation axis of the positioning arm upon pivoting movement of the positioning arm.

21. Apparatus as set forth in claim 20 wherein the guide is movable relative to the positioning arm.

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22. A system for applying elongate elastic members to a disposable absorbent article of the type having an absorbent body for absorbing liquid body waste and at least one layer to which the elastic member is secured, the system being adapted for directing the elastic members onto said at least one layer as said at least one layer is moved through the system generally in a flow direction of said at least one layer, said system comprising:

a first apparatus for guiding a first elastic member onto said at least one layer of the article for securement thereto as said at least one layer is moved in the flow direction of said at least one layer; and

15 a second apparatus for guiding a second elastic member onto said at least one layer of the article for securement thereto as said at least one layer is moved in the flow direction of said at least one layer;

20 each apparatus comprising a guide assembly having a guide adapted for receiving and guiding a respective one of the first and second elastic members onto said at least one layer of the article, each guide assembly being movable generally laterally relative to the flow direction of said at least one layer for guiding the elastic members onto said at least one layer along respective first and second securement paths such that at least a portion of each securement path extends generally oblique to the flow direction of the at least one layer of the article, said apparatus being adapted to move the guide

of each apparatus relative to the respective guide assembly of each apparatus for further guiding the elastic members onto said at least one layer of the article generally transversely within the securement path.

23. A system as set forth in claim 22 wherein the disposable absorbent article has longitudinally opposite ends and laterally opposite side edges, the first apparatus being adapted for guiding one elastic member onto the at least one layer of the article generally adjacent one of side edge of said article, the second apparatus being adapted for guiding the other elastic member onto the at least one layer generally adjacent the opposite side edge of said article.

24. A system as set forth in claim 23 wherein the lateral spacing between the laterally opposite side edges of said article varies between the longitudinal ends of said article, the first and second apparatus being adapted to move each guide assembly generally laterally relative to the flow direction of said at least one layer for guiding the elastic members onto said at least one layer along respective first and second securement paths whereby the securement paths generally follow the contour of the laterally opposite side edges of the article.

25. A system as set forth in claim 22 wherein the guide assembly of each of said first and second apparatus has at least two guides, each of said guides being adapted for guiding at least one elastic member onto said at least one layer of said article along the corresponding one of the first and second securement paths, each apparatus being adapted to move the guides of each guide assembly relative to the guide assembly for guiding the elastic members onto said at least one layer of said article in variable spaced relationship with each other within each of said first and second securement paths.

26. A system as set forth in claim 22 wherein the first and second apparatus are spaced laterally from each other relative to the flow direction of the at least one layer of the article.

27. A system as set forth in claim 22 wherein the first and second apparatus are spaced vertically from each other.

28. A system as set forth in claim 22 wherein the second apparatus is generally inverted relative to the first apparatus.

29. A method of applying an elongate member to a substrate, the method comprising the steps of:

moving the substrate in a flow direction thereof;
feeding the elongate member to a guide capable of guiding the elongate member onto the substrate along a securement path, the guide being supported by a guide assembly for conjoint lateral movement therewith relative to the flow direction of the substrate;

10 moving the guide assembly laterally relative to the flow direction of the substrate so that at least a portion of the securement path extends generally oblique to the flow direction of the substrate;

moving the guide relative to the guide assembly to vary the position of the elongate member transversely within the securement path as the elongate member is guided onto the substrate; and

securing the elongate member to the substrate.

30. A method as set forth in claim 29 wherein said guide moving step comprises moving the guide relative to the guide assembly to guide the elongate member onto the substrate generally in a periodic wave pattern within the securement path.

31. Apparatus for guiding an elongate member onto a substrate as the substrate is moved relative to the apparatus in a flow direction of said substrate, said apparatus comprising:

5 a guide assembly having a guide adapted for receiving and guiding the elongate member onto the substrate, the guide being supported on the guide assembly for orbiting movement relative to the guide assembly through an arc of up to about 360° to vary the position of the guide laterally relative to the flow direction of the substrate.

32. Apparatus as set forth in claim 31 wherein the guide assembly has an axis about which the guide is orbital relative to the guide assembly, said apparatus being adapted for moving the guide assembly laterally relative to the flow direction of the substrate to vary the lateral position of the axis about which the guide orbits.

53. Apparatus as set forth in claim 32 wherein the guide assembly further comprises a positioning arm adapted for pivoting movement about said axis of the guide assembly through a rotation of up to about 360°, the positioning arm extending radially outward relative to said guide assembly axis, the guide being supported by the positioning arm in radially spaced relation with said axis for orbiting movement about said axis upon pivoting movement of the positioning arm.

54. Apparatus as set forth in claim 33 wherein the guide is supported by the positioning arm in an angular orientation relative to the flow direction of the substrate, said apparatus being adapted to move the guide relative to the positioning arm such that the angular orientation of the guide relative to the flow path of the substrate remains substantially constant as the guide orbits about said guide assembly axis.